

FIELD-SHIELD-TRENCH ISOLATION FOR GIGABIT DRAMS

Abstract of the Disclosure

A dynamic random access memory (DRAM) formed in a semiconductor body has individual pairs of memory cells that are isolated from one another by a vertical electrical isolation trench and are isolated from support circuitry. The isolation trench has sidewalls and upper and lower portions, and encircles an area of the semiconductor body which contains the memory cells. This electrically isolates pairs of memory cells from each other and from the support circuitry contained within the semiconductor body but not located within the encircled area. The lower portion of the isolation trench is filled with an electrically conductive material that has sidewall portions thereof which are at least partly separated from the sidewalls of the lower portion of the trench by a first electrical insulator, and that has a lower portion that is in electrical contact with the semiconductor body. The upper portion of the isolation trench is filled with a second electrical insulator.